

Claims

- [c1] A thermal control system for a light source of a vision system comprising:
a cooling assembly having a cooling device and being thermally coupled to the light source;
a thermal sensor thermally coupled to the light source and generating a light source temperature signal; and
a control circuit coupled to said cooling assembly and to said thermal sensor, said control circuit operating said cooling device when said light source temperature signal is above a minimum temperature limit.
- [c2] A system as in claim 1 wherein said cooling assembly comprises a cooling fan in thermal communication with said light source, said control circuit operating said cooling fan when said light source temperature signal is above said minimum temperature limit.
- [c3] A system as in claim 2 wherein said cooling assembly comprises:
a heat sink thermally coupled to said light source; and
an air sleeve thermally coupled to said heat sink and said cooling fan;
said control circuit operating said cooling fan to circulate

air across said heat sink.

- [c4] A system as in claim 2 wherein said control circuit increases a rotational speed limit of said cooling fan when speed of the vehicle increases.
- [c5] A system as in claim 2 wherein said cooling fan has a base operating speed that corresponds with ambient temperature.
- [c6] A system as in claim 2 wherein said control circuit operates said cooling fan at a maximum speed when temperature of said light source increases rapidly.
- [c7] A system as in claim 2 wherein said control circuit adjusts cycle time of said cooling fan.
- [c8] A system as in claim 2 wherein control circuit in operating said cooling fan ramps rotational speed of said cooling fan.
- [c9] A system as in claim 2 wherein said control circuit deactivates said cooling fan when temperature of said light source is greater than a predetermined limit.
- [c10] A system as in claim 1 further comprising a vehicle speed sensor generating a vehicle speed signal, said control circuit operating said cooling device in response to said vehicle speed signal.

- [c11] A system as in claim 1 further comprising an ambient temperature sensor generating an ambient temperature signal, said control circuit activating said cooling device in response to said ambient temperature signal.
- [c12] A system as in claim 1 wherein said control circuit comprises a fan speed adjustment circuit adjusting speed of said cooling device.
- [c13] A system as in claim 12 wherein said fan speed adjustment circuit adjusts speed of said cooling device in response to ambient temperature.
- [c14] A system as in claim 12 wherein said fan speed adjustment circuit adjusts speed of said cooling device in response to vehicle speed.
- [c15] A system as in claim 1 wherein said control circuit comprises a fan drive circuit.
- [c16] A system as in claim 15 wherein said fan drive circuit comprises activates said cooling device when temperature of said light source is greater than a pre-determined temperature limit.
- [c17] A vision system of a vehicle comprising:
 - an illuminator assembly having a light source and generating an illumination beam;

a thermal control system having a cooling device thermally coupled to said illuminator assembly;
a receiver assembly generating an image signal in response to at least a reflected portion of said illumination beam; and
at least one controller controlling generation of said illumination beam and said image signal and thermally controlling operating range of said light source through operation and duration adjustment of said cooling device.

[c18] A vision system as in claim 17 wherein said thermal control system comprises a cooling fan in thermal communication with said light source, said control circuit operating said cooling fan when said temperature signal is above a minimum temperature limit.

[c19] A method of thermally controlling operating range of a light source of a vision system for a vehicle comprising:
generating a light source temperature signal in response to temperature of the light source; and
cooling the light source in response to said temperature signal.

[c20] A method as in claim 19 wherein cooling the light source is in response to said light source temperature signal and in response to speed of the vehicle.

- [c21] A method as in claim 19 wherein cooling the light source is in response to said light source temperature signal and in response to ambient temperature.
- [c22] A method as in claim 19 wherein cooling the light source comprises adjusting cycle time of a cooling device.